

REMARKS

Upon entry of this paper, claims 1, 81, and 82 have been amended, no claims have been canceled, and no claims have been added as new claims. Thus, claims 1-82 are presently pending in this application, with claims 30-80 having been withdrawn previously. No new matter has been added.

Interview Summary

Applicant thanks the Examiner for conducting the telephone interview on September 2, 2009. During said interview, the discussion primarily focused on the rejections under 35 U.S.C. §103, following confirmation that the claim objections and rejections under §112 would be withdrawn based on previous amendments. Specific attention was paid to the interpretation of Muir, et al., “OAM&P for EFM” in view of various references.

The Examiner asserted that on page 3 of the Muir reference, the phrase at bullet #2 stating, “Take OAM&P feature set from e.g. VDSL, SONET, etc and support one common set...” indicated a teaching or suggestion of identifying OAM&P complete feature sets of all protocols listed (e.g., VDSL, SONET, and others) and this phrase places all of the complete lists of features into one common location. In other words, the phrase “common set” is to be interpreted as the union of all features from all protocols considered, according to the Examiner.

The Examiner further asserted that despite the Muir reference being focused only on Ethernet in the First Mile (EFM), the reference could be interpreted to be suggestive of the complete end-to-end Ethernet network protocol.

All §103 rejections rely upon the above interpretations to combine the subset of OAM&P features actually disclosed in Muir for EFM, with a plurality of SONET references discussing full SONET OAM&P functionality on SONET networks for integration into an OAM&P feature set for Ethernet (not just EFM). The Examiner acknowledged that if his interpretation of the phrase “common set” were incorrect, the rejections could not be maintained. The Examiner

maintained that despite the disclosure of Muir being focused only on EFM, this was suggestive of the complete Ethernet network and its corresponding protocols and standards.

Applicant's Representative asserted that the phrase "common set" is to be interpreted as the intersection of the features identified in the full protocols of VDSL, SONET, and others, not the union of these feature sets. Applicant's Representative further noted that the Muir reference actually *teaches away* from the provision of full SONET OAMP functionality (instead, teaching the selection of an intersecting sub-set, and then further reducing that set of features to a narrower sub-set as described in bullet #3 of page 3 of Muir). Furthermore, Applicant's Representative asserted that the Muir reference was only directed at EFM configuration, and not at the network architecture of the larger Ethernet network as a whole. Because of this distinction, Applicant's Representative asserted there is no teaching or suggestion of a network architecture handling node-to-node or end-to-end communications. Rather, there is only discussion of the first or last mile, and how the Ethernet network architecture can be connected with various media types at an end point of a transmission.

The Examiner suggested amending the claims to demonstrate how Ethernet MAC SDH/SONET OAM&P functionality is provided. Applicant's Representative indicated that this has already been done with the provision of language such as "by managing Wave layer, Physical layer, Line layer, Section layer, and Path layer on an Ethernet network", and "a MAC OAMP Control sublayer managing OAMP state and processing OAMP control frames stored on the Ethernet MAC hardware device". Because neither EFM, nor Ethernet, manage OAMP by managing all of these layers, the structural difference is clear.

Claim Objections

Claims 81-82

Claims 81-82 are objected to because of the informalities described in the most recent Office Action.

Specifically, the Action noted that full written out phrases for "MAC" and "OAMP" need to be provided. Applicant has noted to the Examiner that the previously filed amendment

in this matter made the necessary changes. The Examiner has confirmed that these objections will be withdrawn in view of the previously submitted amendments. As such, Applicant respectfully requests withdrawal of these objections.

Claim Rejections – 35 USC § 112

Claims 1-28

Claims 1-28 were rejected as allegedly being directed to a single means claim. Claims 24, 81-82 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention due to lack of antecedent basis.

Applicant has noted to the Examiner that the previously filed amendment in this matter made the necessary changes to overcome these rejections. The Examiner has confirmed that these rejections will be withdrawn in view of the previously submitted amendments. As such, Applicant again respectfully requests withdrawal of these objections.

Claim Rejections – 35 USC § 103

Rejections

Claim 81 is rejected under 35 U.S.C. 103(a) as being unpatentable over Muir et al. "OAM&P for EFM" in view of Hall et al. (US 7,227,844) (as evidenced by Ellis et al US 6,888,791). Claim 82 is rejected under 35 U.S.C. 103(a) as being unpatentable over Muir et al. "OAM&P for EFM" in view of Dreyer et al. (US 6,098,103) and Hall et al (US 7,227,844) (as evidenced by Ellis et al US 6,888,791). Claims 1-9, 11, 12-16, 18, 20-22, 25-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muir et al. "OAM&P for EFM" in view of Dreyer et al. (US 6,098,103), Hall et al. (US 7,227,844,) (as evidenced by Ellis et al US 6,888,791), and Tanaka et al (US 5,289,469). Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Muir et al. "OAM&P for EFM" in view of Dreyer et al. (US 6,098,103), Hall et al. (US 7,227,844,) (as evidenced by Ellis et al US 6,888,791), and Tanaka et al (US 5,289,469) as applied to claim 1 above, further in view of Dawson (US 6,775,804). Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Muir et al. "OAM&P for EFM" in

view of Dreyer et al. (US 6,098,103), Hall et al. (US 7,227,844,) (as evidenced by Ellis et al US 6,888,791), and Tanaka et al (US 5,289,469) as applied to claim 1 above, further in view of Wils et al (US 2004/0022185). Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Muir et al. "OAM&P for EFM" in view of Dreyer et al. (US 6,098,103), Hall et al. (US 7,227,844,) (as evidenced by Ellis et al US 6,888,791), and Tanaka et al (US 5,289,469) as applied to claim 1 above, further in view of Alder (US 7,068,663). Claims 23, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muir et al. "OAM&P for EFM" in view of Dreyer et al. (US 6,098,103), Hall et al. (US 7,227,844,) (as evidenced by Ellis et al US 6,888,791), and Tanaka et al (US 5,289,469) as applied to claim 1 above, further in view of Jacobson et al (US 6,381,250). Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Muir et al. "OAM&P for EFM" in view of Dreyer et al. (US 6,098,103), Hall et al. (US 7,227,844,) (as evidenced by Ellis et al US 6,888,791), and Tanaka et al (US 5,289,469) as applied to claim 1 above, further in view of Pinto et al (US 2002/0133622).

Muir is the Primary Reference

All of the above §103 rejections rely on the Muir reference as the primary reference. Muir discloses requirements to support limited Ethernet OAM&P features in Ethernet in the First Mile (EFM) network – These features were later standardized as Ethernet Subscriber Access Network (SAN) (IEEE Std 802.3-2005, Section Five) (*see* detailed discussion in response to Office Action dated December 24, 2008 (Pages 16-19). It should be noted that IEEE Std 802.3-2005, Section Five does not provide OAM&P functionality to the same extent it is provided in Synchronous Optical Network (SONET) Transport standard (Bellcore GR-253-CORE) and Synchronous Digital Hierarchy (SDH) for (ITU-T G.707/Y.1322) for SDH/SONET. There is a smaller feature set for EFM.

Muir Teaches Away From Full SDH/SONET OAMP Functionality

Applicant respectfully submits that Muir teaches away from having the full functionality of SDH/SONET in the EFM Ethernet environment to which it pertains. Muir does not disclose, teach, or suggest combination with any technology having to do with the support of Ethernet MAC SDH/SONET OAMP functionality for Wave, Physical, Line, Section, and Path layers in such a way that full SDH/SONET protocol OAMP functionality can be implemented in Ethernet protocol networks (*see* claims 1, 81, and 82).

Furthermore, there is no motivation in EFM (Ethernet in the First Mile) to modify the EFM architecture of Muir to provide full SDH/SONET OAMP feature set.

Even if Muir is interpreted as suggesting the re-design of the EFM architecture to provide the full OAM&P feature set of SDH/SONET (an interpretation with which the Applicant disagrees), *Muir does not teach or suggest how to implement the full OAM&P feature set of SDH/SONET using SDH/SONET Network Layer Architecture (Physical, Line, Section, and Path Layers)(as with the present invention), nor does it teach or suggest doing so “by managing Wave layer, Physical layer, Line layer, Section layer, and Path layer on an Ethernet protocol network” (see independent claims 1, 81, and 82). These specific structural limitations are not found in any of the combined references.*

Demonstration of Improper Use of Hindsight

During the aforementioned telephone interview, the Examiner asserted that from Muir it is obvious to one of ordinary skill in the art how to implement SDH/SONET in an Ethernet Network. Applicant respectfully disagrees. The Examiner is relying upon inappropriate use of hindsight in making this determination of obvious. At the time of the invention, and also subsequent to the time of invention, those of ordinary skill in the art have struggled to invent a system and method for dealing with OAM&P functionality in Ethernet protocol networks. In illustration of this fact, Applicant submits herewith a supplemental IDS providing several relevant references. Following are quotes from these references, published by people in the industry, which clearly demonstrate that the implementation of SDH/SONET OAMP functionality is not obvious in traditional Ethernet protocol networks.

1. “Metro Ethernet Marches On”, January 20, 2009, By Richard Grigonis, Executive Editor, IP Communications Group (<http://www.tmcnet.com/news/2009/01/20/3926541.htm>).

Wade Appelman, Vice President of Sales and Marketing for Lightstorm, says, “**The market now understands that you can’t take enterprise Ethernet silicon and apply it to the Carrier Ethernet application.** Silicon has traditionally been around from Broadcom or Marvell – and there a lot of what

I would like to call Carrier Ethernet 1.0 applications that have used such silicon and they've wrapped FPGAs [Field-Programmable Gate Arrays] around them, or they've used network processors to build products. But those have a cost and power consumption associated with them. So, **the trend we're now seeing is for people wanting to add the new Carrier Ethernet features, like OAM, performance monitoring, network synchronization and timing, and they need to have a new type of device that you can't build with enterprise silicon components.**" *(Note: this text highlighted in IDS reference copy)*

2. "Building Large Metro Ethernets Requires MPLS", 10/25/2004 by Rod Hoekman, Senior Solutions Marketing Manager, Alcatel (<http://www.convergedigest.com/bp-me/bp1.asp?ID=168&ctgy=>).

"Another MPLS benefit is the standards-based suite of operations, administration and maintenance (OAM) diagnostic tools. Service providers rely on OAM for the ability to manage, provision and rapidly diagnose outages. This ability to quickly respond to network conditions represents considerable operational savings and helps promote customer loyalty. **This functionality cannot be implemented in a bridged Ethernet network.**" *(Note: this text highlighted in IDS reference copy)*

3. BCR VIRTUAL ROUNDTABLE, "Metro Ethernet: Still on the Horizon" from the June 2002 issue of Business Communications Review, pp. 28–34 by Eric Krapf, managing editor of Business Communications Review, (http://cache.zoominfo.com/CachedPage/?archive_id=0&page_id=296836805&page_url=%2f%2fwww.businesscommunicationsreview.com%2fbcrmag%2f2002%2f06%2froundtable.asp&page_last_updated=6%2f21%2f2002+12%3a45%3a13+PM&firstName=Jay&lastName=Shuler).

Jay Shuler, VP Marketing & Business Development, Luminous, "**Traditional Ethernet is not capable of providing the carrier class capabilities of SONET.**" *(Note: this text highlighted in IDS reference copy)*

The above articles, ranging from 2002 to 2009, clearly demonstrate that those of ordinary skill in the industry either feel that SDH/SONET OAMP functionality cannot be implemented completely in an Ethernet protocol network, or they are undecided as to how to attempt to implement such functionality. *As such, Applicant respectfully submits that the position that it would be “obvious to one of ordinary skill in the art to modify / combine the features of Muir” with the various other references cited in the above §103 rejection inappropriately relies upon hindsight.*

Additional Points of Distinction vs. Muir

As stated previously, the disclosure of Muir differs from the present invention in substantial ways that prevent combination of Muir with the various references listed in the rejections due to a specific teaching away, or due to structural incompatibilities.

Muir discloses requirements for limited OAM&P (Page 3, third bullet and Pages 4-5) only on EFM networks (Page 1, Title, Page 2, first bullet, Pages 3-5, and Pages 7-14). There is no discussion of Local Area Network, Metro Ethernet Network, and Wide Area Network (LAN/MAN/WAN) (*see* Office Action dated December 24, 2008 response figure 1).

More specifically, Page 3, first bullet, states, “define a **single** set of OAM&P features that will operate over EPON, EoVDSL and Pt-Pt Ethernet” which means to define **single/common** set of OAM&P features that will operate over the different EFM technologies. This is clearly restated in Summary on Page 14, second bullet as “define a **common** set of OAM&P features which will be supported by all the likely EFM technologies, i.e., EoVDSL, EPON, and Pt-Pt- fiber”. The word “common” is being used to state that the same set of OAM&P features will be defined for use across all the EFM technologies (which can only be interpreted as an **intersection** of feature lists from each of the technologies).

Page 3, second bullet, states, “Take OAM&P feature set from e.g., VDSL, SONET, etc and support one common set...”. This means take the **applicable** subset of OAM&P features from other technologies and make one set “common” across all EFM technologies. Additionally, the bullet states “support one common set...” referring to the previous bullet of a single/common set of OAM&P features that will operate over all the EFM technologies and not

that a “common” set of OAM&P features will consist of **all** the OAM&P features from “VDSL, SONET, etc” in a single bucket. As mentioned above this interpretation can be verified on Page 14, second bullet. The “common set” is in the context of all EFM technologies and not in the context of other OAM&P technology features.

Page 3, third bullet, states, “EFM will probably require *less* OAM&P features (subset) than those required for carrier backbone”. This means that EFM will need a **subset** of OAM&P features (also restated in Summary on Page 14, fourth bullet) as opposed to carrier backbone. The technology of the Muir reference relates to the EFM study group where the objective requirement is for a limited set of OAM&P for EFM (Page 2, first bullet, and EFM Study Group Meeting May 2001 Presentation Materials May 2001 Meeting minutes, Page 11 (http://www.ieee802.org/3/efm/public/may01/minutes_05_2001.pdf)).

In addition, Muir operates in the EFM network environment, which has no actual or equivalents to Wave, Physical, Line, Section, and Path layers (*see* Office Action dated December 24, 2008 response figures 1 and 2). Ethernet MAC operates in OSI Layer 2. SDH/SONET PHY operates in OSI Layer 1 and SDH/SONET PHY Layer 1 does not contemplate MAC Layer 2. So it cannot be deemed an obvious step to implement SDH/SONET OAMP functionality in an Ethernet protocol network because Ethernet is a LAN/MAN/SAN standard and does not have or need these layers. In contrast, WAN SDH/SONET protocols for wide area communications need these layers to support network equipment such as amplifiers, regenerators, and wave multiplexers. Such network equipment does not exist in Ethernet and is not defined in the Ethernet protocol, nor is it needed because Ethernet is substantially a LAN technology. Ethernet only has the equivalent of Layer 2 (MAC layer) to manage Ethernet MAC bridging/switching and Layer 1 (PHY layer) to manage Ethernet physical layer repeaters.

The present invention modifies Ethernet Network Architecture to introduce Wave, Physical, Line, Section and Path layer concepts into Ethernet technology in the Ethernet MAC Layer 2. These concepts do not exist in conventional/traditional Ethernet prior to the present invention. Likewise, SDH/SONET does not support OAMP concepts in Layer 2, as it does not exist. Therefore it cannot be deemed obvious from the cited references to be able to teach or suggest the present invention.

In further distinction from the present invention, Muir discloses the use of limited OAM&P features (Pages 4-5), but it should be noted that limited OAM&P features are not the same as SDH/SONET OAMP functionality because they are, in fact, more limited. Additionally, the OAM&P features discussed in Muir may have the same names but they are actually implemented in different way than SDH/SONET OAMP and the present invention.

Muir teaches away from full SDH/SONET OAMP features/functionality (Page 2, fourth bullet, Page 3 third bullet, and Page 5, last row) so as to keep the cost of the EFM Ethernet equipment low (Page 2, third bullet). Whereas in the present invention for local/metro/wide area communication, the manageability of the network (Opex) is as important as the cost of the equipment (Capex).

EFM/SAN EPON Ethernet MAC Point to Point and Point to Multipoint (P2P and P2MP) hardware are not the same as the LAN/MAN Ethernet MAC hardware (IEEE Std 802.3-2005, Page 1, section 56.1.1.1-56.1.2.1, Figure 56-1, and Figure 56-2).

In addition, SDH/SONET implements OAMP features in SDH/SONET Overhead bytes in the header field of the SDH/SONET frames. Ethernet does not have any Overhead bytes in the header field. Hence, there is no obvious way to implement these features in Ethernet protocol networks.

Finally, SDH/SONET is a synchronous bit stream oriented protocol. Ethernet is asynchronous packet oriented protocol. These are diametrically opposite technologies. Implementing of SDH/SONET OAMP functionality from a synchronous bit stream oriented protocol to an asynchronous packet oriented is not an obvious step.

In view of all of the above additional distinctions, one of ordinary skill in the art would not find it obvious from the cited references to teach or suggest the present invention (*see* detailed discussion in response to Office Action dated December 24, 2008 (Pages 16-19).

Additionally, the claims as amended herein further have been amended to further clarify that which Applicant believes to be his invention. In view of the above comments, Applicant respectfully requests the Examiner reconsider and withdraw these rejections.

Applicant respectfully submits that all of the prior art combinations stated in the most recent Office Action fail to disclose or suggest every limitation of Applicant's claims 1, 81, and 82, as well as all claims depending therefrom, which are patentable in view of their dependency upon allowable base claims as well as their own claim characteristics. Applicant further submits that the claims of the present invention are not obvious with respect to, and are therefore allowable over, the cited references.

CONCLUSION

In view of the foregoing, it is respectfully submitted that this application is now in condition for allowance. Applicant courteously solicits allowance of the claims in the form of a Notice of Allowance. Should there be any outstanding issues of patentability following the entry of this response, a telephone interview is respectfully requested to resolve such issues.

Please charge any shortage or credit any overpayment of fees to our Deposit Account No. 50-3655. In the event that a petition for an extension of time is required to be submitted herewith, and the requisite petition does not accompany this response, the undersigned hereby petitions under 37 C.F.R. §1.136(a) for an extension of time for as many months as are required to render this submission timely. Any fee due is authorized to be charged to the aforementioned Deposit Account.

Dated: September 17, 2009

Respectfully submitted,

By 

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